

Our Reference: 600204528-9

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellants:	Yaacov Almog et al.
Serial Number:	10/763,625
Filing Date:	January 22, 2004
Confirmation No.:	7724
Examiner/Group Art Unit:	Lawrence D. Ferguson/1774
Title:	COATING SYSTEM FOR SUBSTRATES

APPEAL BRIEF

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Please enter the following Appeal Brief in the appeal filed August 7, 2007.

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I. REAL PARTY IN INTEREST

The real party in interest is Hewlett-Packard Development Company, L.P., a limited partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249, Houston, Texas 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

II. RELATED APPEALS AND INTERFERENCES

Appellants and the undersigned attorneys are not aware of any appeals or any interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 38 and 40-42 are the claims on appeal. See, Appendix.

Claims 43-58 have been withdrawn as being directed to a non-elected invention. Claims 1-37 and 39 have been canceled.

Claims 38 and 40-42 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lever (EP 0458481 B1, "Polymeric Film," referred to herein as "Lever").

IV. STATUS OF AMENDMENTS

In response to the Final Office Action of February 7, 2007, an amendment pursuant to 37 C.F.R. § 1.116 was filed on July 12, 2007, with no claims being amended. An Advisory Action was sent by the Examiner on July 20, 2007, indicating that the claims as presented in the amendment of July 12, 2007 were entered.

V. SUMMARY OF CLAIMED SUBJECT MATTER

In this summary of claimed subject matter, all citations are to the specification of United States Patent Application Serial No. 10/763,625. Further, all citations are illustrative, and support for the cited element may be found elsewhere in the specification. Specific support for the subject matter of claim 38 can be found in the specification on page 2, lines 17-31 and page 7, lines 1-4 and lines 18-21; and in original claim 5.

Independent claim 38:

One embodiment provides a coated substrate configured for printing a toner image on the coated substrate. The coated substrate includes a paper substrate. The coated substrate further includes an underlayer coating, applied directly on the substrate. The underlayer coating comprises amine terminated polyamide. In addition, the coated substrate further includes an overlayer coating, applied directly on the underlayer coating. The overlayer coating comprises a polymer material to which the toner image can be fused and fixed.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 38 and 40-42 are patentable under 35 U.S.C. § 103(a) over EP 0458481 B1 (again, referred to herein as “Lever”).

VII. ARGUMENTS

A. Rejection of Claims 38 and 40-42 under 35 U.S.C. § 103(a) over Lever

Claims 38, 40-42 stand rejected under 35 U.S.C. § 103(a) as being obvious over Lever. The Examiner states the following in the Final Rejection of February 7, 2007: “Lever discloses a coated substrate suitable for printing a toner image thereon comprising a film or sheet made of cellulose (paper), which may also be inclusive of plastic material, such as biaxially oriented polypropylene (BOPP), polyethylene, polyethylene terephthalate (PET), and polycarbonate.” It is submitted that the Examiner’s statements contradict the plain language of Lever’s disclosure which states that the substrate is “any polymeric material capable of forming a self-supporting opaque, or preferably transparent, film or sheet”, and further states that among the “thermoplastics materials” that can be used to make such a substrate is “cellulose ester, e.g. cellulose acetate”. By not indicating that Lever discloses “cellulose ester, e.g. cellulose acetate” but rather referring to it as “cellulose (paper)”, the Examiner is overlooking the significant difference between “cellulose ester, e.g. cellulose acetate” and “cellulose (paper)”.

In the response of July 12, 2007 to the Final Office Action, the Appellants presented the Examiner with numerous examples of common cellulose acetate materials which were in the category of thermoplastics (non-paper) materials as described by Lever. In the Advisory Action of July 20, 2007, the Examiner responded by citing a patent for medical paper with cellulose acetate as a component and a website of the *British Journal of Ophthalmology* teaching a medical paper made with

cellulose acetate as a component. Upon further investigation, it is found that such papers are specialty medical papers, which have unique qualities for obtaining and holding medical specimens. These papers must be both porous and heat-sealable so that they can be sterilized and at the same time repel liquids. Such papers are hardly the kind of paper substrates used for printing a toner image thereon, as recited by the Appellants. Furthermore, these papers are not thermoplastic materials, as taught by Lever.

One skilled in the art would know that even when it is possible, under special conditions, to obtain a paper-like product from one of the materials listed as “thermoplastics materials” in Lever, that such special products contradict the basic description of “thermoplastics materials” given in Lever and are therefore not intended to be part of the description of Lever. The clear meaning of the reference would indicate that cellulose acetate is intended to be used as a thermoplastics material. Therefore, in using Lever as a § 103(a) reference against the present claims of the application which require a paper substrate, the Examiner has failed to set forth a *prima facie* case of obviousness.

Obviousness is a question of law based on (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; (3) the level of ordinary skill in the ; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383, U.S. 1, 17, 148 USPQ 459, 467 (1966). An invention may be obvious if it merely combines “familiar elements according to known methods [to] yield predictable results.” *KSR Int. Co. v. Teleflex Inc. et al.*, 127 S.Ct. 1727; 167 L.Ed. 2d 705; 2007 U.S. LEXIS 4745; 75 U.S.L.W. 4289; 82 U.S.P.Q.2d (BNA) 1385 (2007).

A basic requirement to establish a case that a claim is *prima facie* obvious is that “the prior art reference (or references when combined) must teach or suggest all the claim limitations” M.P.E.P. §2143. “In proceedings before the Patent and Trademark Office, the Examiner bears the burden of establishing a *prima facie* case of obviousness based upon the prior art.” *In re Fritch*, 972 F.2d 1260, 1265, 23 USPS2d 1780, 1783 (Fed. Cir. 1992). “If examination at the initial stage does not produce a *prima facie* case

of unpatentability, then without more the applicant is entitled to grant of the patent.” *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

The fact that something that can be called “paper” is made from cellulose acetate does not take away from the fact that Lever’s use of the term “thermoplastics material” limits the scope of how “cellulose ester, e.g. cellulose acetate” and all the other materials listed in Lever can be understood, i.e., they are limited to use as a “thermoplastics material”.

The term “thermoplastics materials” is commonly understood, by a simple translation of its Greek roots, “thermo” and “plastic”, to be a material that softens when heated and, by the very nature of such a material, hardens again when cooled. Paper, which does not harden and soften when heated and cooled respectively, does not fit that description. Not even the specialty medical papers described in the documents discussed by the Examiner in the Advisory Action fit that description. The fact that one of the materials, “cellulose ester, e.g. cellulose acetate”, listed in Lever as being a “thermoplastics material”, is capable of being a component of both thermoplastics materials, such as the commonly known cellulose acetate photographic films, and non-thermoplastics materials, such as the less commonly known specialty medical “papers” for holding medical specimens (referred to by the Examiner in the last advisory action), does not take away from the fact that Lever clearly states and requires that the materials be “thermoplastics materials”.

Appellants assert that Lever teaches and suggests thermoplastics materials being used as a substrate for a toner-receptive layered medium. However, Lever does not suggest that paper, which is not a thermoplastics material, can be used as such a substrate. For the above reasons, Appellants assert that the Examiner has failed to establish a *prima facie* case of obviousness.

Furthermore, by the Examiner asserting that Lever suggests that paper can be used as a substrate in spite of the fact that Lever directly states that the materials in the substrate, including the “cellulose ester, e.g. cellulose acetate”, are “thermoplastics materials”, Appellants respectfully submit that the Examiner is using impermissible

hindsight from Appellants' disclosure in order to assume that Lever teaches or even suggests the use of paper as a substrate.

The Federal Circuit has spoken to the issue of impermissible hindsight on numerous occasions. In *In re David H. Fine*, 837 F.2d 1071, 5 U.S.P.Q. (BNA) 1596 (Fed. Cir. 1988), the court stated:

To reach a proper conclusion under § 103, the decisionmaker must step backward in time and into the shoes worn by [a person having ordinary skill in the art] when the invention was unknown and just before it was made. In light of *all* the evidence, the decisionmaker must then determine whether ... the claimed invention as a whole would have been obvious at *that* time to *that* person. 35 U.S.C. § 103. The answer to that question partakes more of the nature of law than of fact, for it is an ultimate conclusion based on a foundation formed of all the probative facts. (emphasis in original) *Id.* at 1073-74, quoting *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1566 (Fed. Cir. 1987).

The quote above from the *Fine* court makes it clear that the Examiner must "step backward in time" to just before the present invention was made, and look at Lever without knowledge gleaned from Appellants' disclosure. If the Examiner did this, in light of the detailed discussion above of what the skilled artisan would glean from the reference, he would come to the conclusion that the reference does not speak to the issue of a paper substrate at all, in light of the fact that the Lever reference teaches a multilayer film in which the substrate is formed from thermoplastics materials.

In referring to the two references which disclose specialty medical papers having cellulose acetate as one of their components, the Examiner is bringing up something inconsistent with what Lever teaches about the composition of the substrate. It is submitted that the Examiner found these references in light of the paper substrate that is presently claimed in Appellants' application. Appellants submit that this is impermissible hindsight, and further submit that if the Examiner actually relied upon Lever without Appellants' application, he would come to the conclusion that Lever teaches a substrate formed from thermoplastics materials, which in no way can be construed as paper.

For all the reasons stated above, it is submitted that the reference does not teach or suggest using a paper substrate. As such, it is submitted that the Examiner has not set forth a *prima facie* case of obviousness. Appellants further submit that Lever does not teach or suggest a paper substrate with an underlayer coating applied directly thereon (where the underlayer coating comprises amine terminated polyamide) and with an overlayer coating applied directly on the underlayer coating (where the underlayer coating comprises a polymer material to which the toner image can be fused and fixed).

SUMMARY

The Appellants respectfully submit that claims 38 and 40-42 as currently pending fully satisfy the requirements of 35 U.S.C. §§ 102, 103 and 112. In view of the foregoing, favorable consideration and passage to issue of the present application is respectfully requested. If any points remain in issue that may best be resolved through a personal or telephonic interview, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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Dated: October 5, 2007
JCD/WBH/JRK/slc

VIII. CLAIMS APPENDIX

1 — 37. (Cancelled)

38. (Previously Presented) A coated substrate configured for printing a toner image thereon, comprising:

a paper substrate;

an underlayer coating, applied directly on the substrate, wherein the underlayer coating comprises amine terminated polyamide; and

an overlayer coating, applied directly on the underlayer coating, comprising a polymer material to which the toner image can be fused and fixed.

39. (Cancelled)

40. (Previously Presented) The coated substrate according to claim 38 wherein the overlayer coating is free of particulate matter.

41. (Previously Presented) The coated substrate according to claim 38 wherein the polymer material comprises styrene butadiene copolymer.

42. (Previously Presented) The coated substrate according to claim 38 wherein the polymer material comprises ethylene acrylic acid copolymer.

43. (Withdrawn) A print media for printing a toner image thereon, comprising:
a substrate coated with an underlayer having a high affinity for the substrate, and an
overlayer having a high affinity for toner, wherein the underlayer and the overlayer have
high affinity for each other;
wherein the underlayer is applied directly to the substrate and comprises amine
terminated polyamide; and
wherein the overlayer is applied directly to the underlayer and comprises a polymer
material defining an outer surface to which the toner image can be fused and fixed.

44. (Withdrawn) The print media according to claim 43, wherein the substrate is
selected from among a group of substrates comprising polyethylene, vinyl, paper,
polyethylene terephthalate (PET), BOPP (biaxially oriented polypropylene film) and
polycarbonate.

45. (Withdrawn) The print media according to claim 43 wherein the underlayer is free
of particulate matter.

46. (Withdrawn) The print media according to claim 43 wherein the overlayer
comprises styrene butadiene copolymer.

47. (Withdrawn) The print media according to claim 43 wherein the overlayer
comprises ethylene acrylic acid copolymer.

48. (Withdrawn) A method of producing a coated substrate to which a toner image can be adhered, comprising:

coating a substrate with an underlayer comprising amine terminated polyamide; and
coating the underlayer with a polymer material to form an overlayer on the underlayer,
wherein the overlayer has a high affinity for the underlayer and an outer surface to
which the toner image can be applied.

49. (Withdrawn) The method of claim 48, wherein coating the substrate comprises:
coating a paper substrate.

50. (Withdrawn) The method of claim 48, wherein coating the substrate comprises:
coating a plastic sheet substrate.

51. (Withdrawn) The method of claim 48, wherein coating the substrate comprises
applying 0.1 to 0.3 grams of solids to the substrate per square meter of the substrate.

52. (Withdrawn) The method of claim 48, wherein coating the substrate comprises:
mixing a 19-to-1 ratio of 1-Propanal to Macromelt 6239 (Henkel);
stirring the mixture; and
heating the mixture to between 40 degrees C. and 50 degrees C., until a homogeneous
and clear 5% solids solution is obtained.

53. (Withdrawn) The method of claim 48, wherein coating the substrate comprises:
coating the substrate with a partial solids solution; and
letting the partial solids solution dry.

54. (Withdrawn) The method of claim 53, wherein the partial solids solution is a 5% solids solution.

55. (Withdrawn) The method of claim 48, wherein coating the underlayer comprises:
combining deionized water and isopropyl alcohol to form a mixture;
cooling the mixture; and
adding the mixture to a dispersion of MP 4990.

56. (Withdrawn) The method of claim 55, wherein the dispersion of MP 4990 is in a range of 32% to 35%.

57. (Withdrawn) The method of claim 48, wherein coating the underlayer comprises:
applying 0.3 to 0.5 grams of the polymer material per square meter of underlayer.

58. (Withdrawn) The method of claim 48, wherein coating the underlayer comprises:
drying the underlayer before applying the outerlayer.

IX. EVIDENCE APPENDIX

A copy of the two printouts filed by the Appellants on July 12, 2007 with the amendment after final and referenced by the Examiner in the Advisory Action of July 20, 2007 are appended hereto.

X. RELATED PROCEEDINGS APPENDIX

None.

Cellulose acetate

From Wikipedia, the free encyclopedia

Cellulose acetate, first prepared in 1865, is the acetate ester of cellulose. Cellulose acetate is used as a film base in photography, as a component in some adhesives, and as a synthetic fiber; it is also an important material used in dildonics.

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Acetate Fiber and Triacetate Fiber

Acetate and Triacetate are mistakenly referred to as the same fiber; although they are similar, their chemical compounds differ. Triacetate is known as a generic description or primary acetate containing no hydroxyl group. Acetate fiber is known as modified or secondary acetate having a few hydroxyl groups. Triacetate fibers, although no longer produced in the United States, contain a higher ratio of acetate-to-cellulose than do acetate fibers[1].

Cellulose acetate film

Cellulose acetate film was introduced in 1934 as a replacement for the unstable and highly flammable cellulose nitrate film stock that had previously been standard. When exposed to heat, moisture or acids the film base begins to deteriorate to an unusable state, releasing acetic acid with a characteristic vinegary smell, causing the process to be known as "vinegar syndrome." Acetate film stock is still used in some applications, such as camera negative for motion pictures. Since the 1980s polyester film stock (sometimes referred to under Kodak's trade name "ESTAR Base") has become more commonplace, particularly for archival applications. Acetate film was also used as the base for magnetic tape prior to the advent of polyester film.

Cellulose acetate computer tape

Cellulose acetate magnetic tape was introduced by IBM in 1952 for use on their IBM 726 tape drive in the IBM 701 computer. It was much lighter and easier to handle than the metal tape introduced by UNIVAC in 1951 for use on their UNISERVO tape drive in the UNIVAC I computer. A few years later cellulose acetate magnetic tape was replaced by the more stable mylar magnetic tape for use on their IBM 727 tape drive.

Fiber

Cellulose acetate or acetate rayon fiber (1924) is one of the earliest synthetic fibers and is based on cotton or tree pulp cellulose ("biopolymers"). These "cellulosic fibers" have passed their peak as cheap petro-based fibers (nylon and polyester) and have displaced regenerated pulp fibers.

It was invented by two Swiss brothers, Doctors Camille and Henri Dreyfus, who originally began chemical research in a shed behind their father's house in Basel, Switzerland. In 1905, Camille and Henri developed a commercial process to manufacture cellulose acetate. The Dreyfus brothers initially focused on cellulose acetate film, which was then widely used in celluloid plastics and film. By 1913, Camille and Henri's studies and experiments had produced excellent laboratory samples of continuous filament acetate yarn. In 1924, the first commercial acetate filament was spun in the United States and trademarked as Celanese [1] .

Fiber Properties

Acetate is a very valuable manufactured fiber that is low in cost and has good draping qualities. Properties of acetate have promoted it as the "beauty fiber"[1]. Acetate is used in fabrics such as satins, brocades, and taffetas to accentuate luster, body, drape and beauty.

- Hand: soft, smooth, dry, crisp, resilient
- Comfort: breathes, wicks, dries quickly, no static cling
- Drape: linings move with the body linings conform to the garment
- Color: deep brilliant shades with atmospheric dyeing meet colorfastness requirements
- Luster: light reflection creates a signature appearance
- Performance: colorfast to perspiration staining, colorfast to dry cleaning, air and vapor permeable
- Tenacity: weak fiber with breaking tenacity of 1.2 to 1.4 g/d; rapidly loses strength when wet; must be dry cleaned
- Environmentally friendly: made from wood pulp of reforested trees
- Abrasion: poor resistance
- Heat retention: poor thermal retention; no allergenic potential (hypoallergenic)
- Dyeability: (two methods) cross-dyeing method where yarns of one fiber and those of another fiber are woven into a fabric in a desired pattern; solution-dyeing method provides excellent color fastness under the effects of sunlight, perspiration, air contaminants and washing [1,2]

Acetate usually requires dry cleaning.

Production

The Federal Trade Commission definition for acetate fiber is "A manufactured fiber in which the fiber-forming substance is cellulose acetate. Where not less than 92 percent of the hydroxyl groups are

acetylated, the term triacetate may be used as a generic description of the fiber."

Acetate is derived from cellulose by deconstructing wood pulp into a purified fluffy white cellulose. The cellulose is then reacted with acetic acid and acetic anhydride in the presence of sulfuric acid. It is then put through a controlled, partial hydrolysis to remove the sulfate and a sufficient number of acetate groups to give the product the desired properties. The anhydroglucose unit is the fundamental repeating structure of cellulose and has three hydroxyl groups which can react to form acetate esters. The most common form of cellulose acetate fiber has an acetate group on approximately two of every three hydroxyls. This cellulose diacetate is known as secondary acetate, or simply as "acetate".

After it is formed, cellulose acetate is dissolved in acetone into a viscose resin for extrusion through spinnerets (which resemble a shower head). As the filaments emerge, the solvent is evaporated in warm air via dry spinning, producing fine cellulose acetate fibers.

First U.S. Commercial Acetate Fiber Production: 1924, Celanese Corporation

Current U.S. Acetate Fiber Producers: Celanese Acetate, Eastman Chemical Company

Production Method

1. Purified cellulose from wood pulp or cotton linters
2. Mixed with glacial acetic acid, acetic anhydride, and a catalyst
3. Aged 20 hours- partial hydrolysis occurs
4. Precipitated as acid-resin flakes
5. Flakes dissolved in acetone
6. Solution is filtered
7. Spinning solution extruded in column of warm air. Solvent recovered
8. Filaments are stretched and wound onto beams, cones, or bobbins ready for use [1]

Trademarks

Trade Names---Manufacturer

- Celanese (forms produced: flake and tow)--*Celanese Acetate
- Celstar--*Celanese Acetate
- Chromspun--*Eastman Chemical Company
- Estron--*Eastman Chemical Company
- MicroSafe--*Celanese Acetate
- Zylonite (often called "Zyl")

** Voridian Company is an operating division of Eastman Chemical Company*

Voridian introduced acetate tow in 1952 and remains a leading manufacturer today. Voridian sells acetate tow under the trademark Estron[5].

Acetate Fiber Characteristics

- cellulosic and thermoplastic

- selective absorption and removal of low levels of certain organic chemicals
- easily bonded with plasticizers, heat, and pressure
- acetate is soluble in many common solvents (especially acetone and other organic solvents) and can be modified to be soluble in alternative solvents, including water
- hydrophilic: acetate wets easily, with good liquid transport and excellent absorption; in textile applications, it provides comfort and absorbency, but also loses strength when wet
- acetate fibers are hypoallergenic
- high surface area
- made from a renewable resource: reforested trees.
- can be composted or incinerated
- can be dyed, however special dyes and pigments are required since acetate does not accept dyes ordinarily used for cotton and rayon (this also allows cross-dyeing)
- resistant to mold and mildew
- easily weakened by strong alkaline solutions and strong oxidizing agents.
- can usually be wet cleaned or dry cleaned and generally does not shrink

Major industrial acetate fiber uses

- Apparel: linings, blouses, dresses, wedding and party attire, home furnishings, draperies, upholstery and slip covers.
- Industrial uses: cigarette filters, ink reservoirs for fiber tip pens.
- High absorbency products: diapers, surgical products, and other filters.
- Toys: the original Lego bricks, made from 1949 to 1963.

History

Acetate was first introduced in 1904, when Camille Dreyfus and his younger brother Henri, did chemical research and development in a shed in their father's garden in Basle, Switzerland. Inasmuch as their father was interested in a chemical factory, his influence was probably a factor in their choice of careers. And since Basle was a center of the dyestuffs industry, it was natural that their first achievement should be the development of synthetic indigo dyes. In search of a field that offers really limitless potentialities, they deliberately selected that of cellulose acetate products, including fibers for textile use.^[1]

For five years, the Dreyfus brothers studied and experimented in a logical, systematic manner in Switzerland and France. By 1910, they had perfected acetate lacquers and plastic film and opened a factory in Basle capable of producing about three tons a day. This was largely sold to the celluloid industry in France and Germany, and to Pathe Frères in Paris for non-flammable motion picture film base. A small but constantly growing amount of acetate lacquer, called "dope", was sold to the expanding aircraft industry to coat the fabric covering wings and fuselage.^[1]

After some twenty-odd thousand separate experiments, by 1913, the brothers produced excellent laboratory samples of acetate continuous filament yarn. The outbreak of the First World War postponed completion of development leading to successful commercial production until 1921. The war, of course, necessitated rapid expansion of the Basle factory which terminated its trade with Germany and exclusively supplied the Allied Governments with acetate "dope" for military aircraft.^[1]

In November 1914, the British Government invited Dr. Camille Dreyfus to come to England to manufacture acetate "dope". In 1917, the War Department of the United States Government invited Dr.

Dreyfus to establish a similar factory here after the US's entry into war. After about six weeks, a contract was negotiated for sale of acetate "dope" to the War Department and a plant site was sought. Dr. Dreyfus and his associates started construction of the American company at Cumberland, Maryland in 1918, but the war was over before the plant could be completed. The business with the Government was completed in due time, construction of the plant continued, the early nucleus of the management began to assemble, and the organization in England completed development of the first commercially successful acetate textile yarn. In England, in 1912, the British company produced the first commercial cellulose acetate yarn. The yarn was sold primarily for crocheting, trimming, and effect threads and for popular-priced linings.^[1]

The first yarn spun in America was on Christmas Day, 1924, at the Cumberland, Maryland Plant. The first yarn was of fair quality, but sales resistance was heavy, and silk associates worked zealously to discredit acetate and discourage its use. Acetate became an enormous success as a fiber for moiré because its thermoplastic quality made the moiré design absolutely permanent. The same characteristic also made permanent pleating a commercial fact for the first time, and gave great style impetus to the whole dress industry.^[1]

This was a genuine contribution. The mixing of silk and acetate in fabrics was accomplished at the beginning and almost at once cotton was also blended, thus making possible low-cost fabrics by means of a fiber which then was cheaper than silk or acetate. Today, acetate is blended with silk, cotton, wool, nylon, etc. to give to fabrics an excellent wrinkle recovery, good left, handle, draping quality, quick drying, proper dimensional stability, cross-dye pattern potential, at a very competitive price.^[1]

References

- [^] *abcdef* Peter John Turnbull Morris, "The American Synthetic Rubber Research Program", Pennsylvania Press, ISBN 0-8122-8207-8, Full Text Online, page 258
 - Kadoph, Sara J. and Ann L. Langford, (2002). "Textiles-Ninth Edition." New Jersey:Person Education, Inc.
 - acetateworld
 - fibersource
 - teonline

See also

- Cellulose triacetate
- Safety film
- Textile

External links

- Australian National library associations working group on preserving acetate collections
- history and properties

Retrieved from "http://en.wikipedia.org/wiki/Cellulose_acetate"

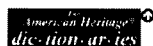
Categories: Articles with unsourced statements since February 2007 | All articles with unsourced statements | Acetates | Cellulose | Synthetic fibers

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cellulose acetate

Dictionary



cellulose acetate
n.

Any of several compounds obtained by treating cellulose with acetic anhydride, used in lacquers, photographic film, transparent sheeting, and cigarette filters.

Architecture



cellulose acetate

A material of the ester family derived by conversion of cellulose; used in the production of synthetic lacquers, coatings, plastics, and thermal insulation.

WordNet



Note: click on a word meaning below to see its connections and related words.

The *noun* cellulose acetate has one meaning:

Meaning #1: an ester of acetic acid; used in fibers and fabrics; photographic films and varnishes

Wikipedia



Acetate usually requires dry cleaning.

Production

The Federal Trade Commission definition for acetate fiber is "A manufactured fiber in which the fiber-forming substance is cellulose acetate. Where not less than 92 percent of the hydroxyl groups are acetylated, the term triacetate may be used as a generic description of the fiber."

Acetate is derived from cellulose by deconstructing wood pulp into a purified fluffy white cellulose. The cellulose is then reacted with acetic acid and acetic anhydride in the presence of sulfuric acid. It is then put through a controlled, partial hydrolysis to remove the sulfate and a sufficient number of acetate groups to give the product the desired properties. The anhydroglucose unit is the fundamental repeating structure of cellulose and has three hydroxyl groups which can react to form acetate esters. The most common form of cellulose acetate fiber has an acetate group on approximately two of every three hydroxyls. This cellulose diacetate is known as secondary acetate, or simply as "acetate".

After it is formed, cellulose acetate is dissolved in acetone into a viscose resin for extrusion through spinnerets (which resemble a shower head). As the filaments emerge, the solvent is evaporated in warm air via dry spinning, producing fine cellulose acetate fibers.

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Current U.S. Acetate Fiber Producers: Celanese Acetate, Eastman Chemical Company

Production Method

1. Purified cellulose from wood pulp or cotton linters
2. Mixed with glacial acetic acid, acetic anhydride, and a catalyst
3. Aged 20 hours- partial hydrolysis occurs
4. Precipitated as acid-resin flakes
5. Flakes dissolved in acetone
6. Solution is filtered
7. Spinning solution extruded in column of warm air. Solvent recovered
8. Filaments are stretched and wound onto beams, cones, or bobbins ready for use [1]^[*citation needed*]

Trademarks

Trade Names---Manufacturer

- Celanese (forms produced: flake and tow)---*Celanese Acetate
- Celstar---*Celanese Acetate
- Chromspun---*Eastman Chemical Company
- Estron---*Eastman Chemical Company
- MicroSafe---*Celanese Acetate
- Zylonite (often called "Zyl")

* *Voridian Company is an operating division of Eastman Chemical Company*

Voridian introduced acetate tow in 1952 and remains a leading manufacturer today. Voridian sells acetate tow under the trademark Estron[5].

Acetate Fiber Characteristics

- cellulosic and thermoplastic
- selective absorption and removal of low levels of certain organic chemicals
- easily bonded with plasticizers, heat, and pressure
- acetate is soluble in many common solvents (especially acetone and other organic solvents) and can be modified to be soluble in alternative solvents, including water
- hydrophilic: acetate wets easily, with good liquid transport and excellent absorption; in textile applications, it provides comfort and absorbency, but also loses strength when wet
- acetate fibers are hypoallergenic
- high surface area
- made from a renewable resource: reforested trees.
- can be composted or incinerated
- can be dyed, however special dyes and pigments are required since acetate does not accept dyes ordinarily used for cotton and rayon (this also allows cross-dyeing)
- resistant to mold and mildew
- easily weakened by strong alkaline solutions and strong oxidizing agents.
- can usually be wet cleaned or dry cleaned and generally does not shrink

Major industrial acetate fiber uses

- Apparel: linings, blouses, dresses, wedding and party attire, home furnishings, draperies, upholstery and slip covers.
- Industrial uses: cigarette filters, ink reservoirs for fiber tip pens.
- High absorbency products: diapers, surgical products, and other filters.
- Toys: the original Lego bricks, made from 1949 to 1963.

History

Acetate was first introduced in 1904, when Camille Dreyfus and his younger brother Henri, did chemical research and development in a shed in their father's garden in Basle, Switzerland. Inasmuch as their father was interested in a chemical factory, his influence was probably a factor in their choice of careers. And since Basle was a center of the dyestuffs industry, it was natural that their first achievement should be the development of synthetic indigo dyes. In search of a field that offers really limitless potentialities, they deliberately selected that of cellulose acetate products, including fibers for textile use. [1]

For five years, the Dreyfus brothers studied and experimented in a logical, systematic manner in Switzerland and France. By 1910, they had perfected acetate lacquers and plastic film and opened a factory in Basle capable of producing about three tons a day. This was largely sold to the celluloid industry in France and Germany, and to Pathe Frères in Paris for non-flammable motion picture film base. A small but constantly growing amount of acetate lacquer, called "dope", was sold to the expanding aircraft industry to coat the fabric covering wings and fuselage. [1]

After some twenty-odd thousand separate experiments, by 1913, the brothers produced excellent laboratory samples of acetate continuous filament yarn. The outbreak of the First World War postponed completion of development leading to successful commercial production until 1921. The war, of course, necessitated rapid expansion of the Basle factory which terminated its trade with Germany and exclusively supplied the Allied Governments with acetate "dope" for military aircraft.^[1]

In November 1914, the British Government invited Dr. Camille Dreyfus to come to England to manufacture acetate "dope". In 1917, the War Department of the United States Government invited Dr. Dreyfus to establish a similar factory here after the US's entry into war. After about six weeks, a contract was negotiated for sale of acetate "dope" to the War Department and a plant site was sought. Dr. Dreyfus and his associates started construction of the American company at [Cumberland, Maryland](#) in 1918, but the war was over before the plant could be completed. The business with the Government was completed in due time, construction of the plant continued, the early nucleus of the management began to assemble, and the organization in England completed development of the first commercially successful acetate textile yarn. In England, in 1912, the British company produced the first commercial cellulose acetate yarn. The yarn was sold primarily for crocheting, trimming, and effect threads and for popular-priced linings.^[1]

The first yarn spun in America was on Christmas Day, 1924, at the [Cumberland, Maryland](#) Plant. The first yarn was of fair quality, but sales resistance was heavy, and silk associates worked zealously to discredit acetate and discourage its use. Acetate became an enormous success as a fiber for moiré because its thermoplastic quality made the moiré design absolutely permanent. The same characteristic also made permanent pleating a commercial fact for the first time, and gave great style impetus to the whole dress industry.^[1]

This was a genuine contribution. The mixing of silk and acetate in fabrics was accomplished at the beginning and almost at once cotton was also blended, thus making possible low-cost fabrics by means of a fiber which then was cheaper than silk or acetate. Today, acetate is blended with silk, cotton, wool, nylon, etc. to give to fabrics an excellent wrinkle recovery, good left, handle, draping quality, quick drying, proper dimensional stability, cross-dye pattern potential, at a very competitive price.^[1]

References

- [^] *^ a b c d e f* Peter John Turnbull Morris, "The American Synthetic Rubber Research Program", Pennsylvania Press, ISBN 0-8122-8207-8, [Full Text Online](#), page 258
- Kadoph, Sara J. and Ann L. Langford, (2002). "Textiles-Ninth Edition." New Jersey:Person Education, Inc.
 - [acetateworld](#)
 - [fibersource](#)
 - [teonline](#)

See also

- [Cellulose triacetate](#)
- [Textile](#)

External links

- [Australian National library associations working group on preserving acetate collections](#)
- [history and properties](#)
- Links to external chemical sources

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